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CLAIMS

What is claimed is:

l	1. A switch matrix circuit comprising:
2	a plurality of switches organized in a row and column configuration; and
3	a current sensing circuit coupled to the plurality of switches, the current sensing
1	circuit including a transistor and at least one resistor per column of the plurality of switches
5	wherein current amplified by the transistor and converted by the at least one resistor in a
5	column is sensed as a logic level indicative of a switch status within the column for a
7	selected row.

- 2. The switch matrix circuit of claim 1 wherein the transistor further comprises a bipolar junction transistor.
- 3. The switch matrix circuit of claim 1 wherein the row and column configuration further comprises an off-diagonal configuration having one switch per row and column intersection in all but one intersection per row.
- 4. The switch matrix circuit of claim 3 wherein each intersection lacking a switch lies in a different column within each row.
- 5. The switch matrix circuit of claim 4 wherein a single scan line supports providing a row input signal or reading a column output signal for one row and one column within the off-diagonal configuration.

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1 .	7. A circuit for more efficient switch selection sensing, the circuit comprising:
2	a switch matrix comprising a plurality of switches organized as a plurality of rows
3	and columns;
4	a current sensing circuit coupled to the switch matrix; and

a processor coupled to the switch matrix and the current sensing circuit by a plurality of scan lines, wherein selection of a row by a scan line returns column current levels from the current sensing circuit to detect if a switch at a row and column intersection of the switch matrix has been selected.

6. The switch matrix circuit of claim 1 wherein a processor senses the switch status.

- 8. The circuit of claim 7 wherein the plurality of scan lines further comprise a plurality of bi-directional scan lines wherein a single scan line provides both row selection and column sensing capabilities.
- 9. The circuit of claim 8 wherein the organization of the plurality of switches further comprise an off-diagonal organization to support the bi-directional scan lines.
- 10. The circuit of claim 7 wherein the current sensing circuit further comprises a transistor and resistor circuit for each column in the switch matrix.
- 11. The circuit of claim 10 wherein the column current levels indicate when the transistor is turned on and current passes through the resistor.
- 12. The circuit of claim 10 wherein the transistor further comprises a bipolar junction transistor.

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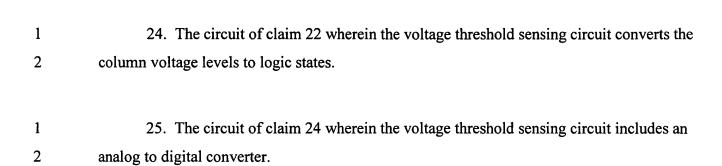
1	13. A method for sensing switch status, the method comprising:
2	coupling a current sensing circuit to a switch matrix having a plurality of switches in
3	a row and column configuration; and
4	utilizing a processor to detect switch status within the switch matrix based on current
5	signals in the current sensing circuit.
1	14. The method of claim 13 further comprising forming the current sensing circuit a
2	a transistor and at least one resistor per column of the plurality of switches.
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1 2 3	15. The method of claim 14 wherein utilizing a processor to detect switch status
2	further comprises detecting current amplified by the transistor and converted by the at least
3	one resistor in a column as a logic level indicative of the switch status within the column for
4	a selected row.
1	16. The method of claim 15 wherein utilizing a processor further comprises utilizing
2	a plurality of bi-directional scan lines, wherein a single scan line provides both row selection
3	and column sensing capabilities.
1	17. The method of claim 16 further comprising organizing the plurality of switches
2 .	as an off-diagonal organization to support the bi-directional scan lines.
1	18. The method of claim 14 further comprising utilizing a bipolar junction transistor
2	as the transistor.
1	19. A switch matrix circuit comprising:

having one switch per row and column intersection in all but one intersection per row; and

a plurality of switches organized in a row and column off-diagonal configuration



4	a plurality of scan lines comprising a plurality of bi-directional scan lines, wherein a
5	single scan line provides both row selection and column sensing capabilities for switch
6	selection identification.
1	20. The switch matrix of claim 19 wherein the one intersection per row lacking a
2	switch lies in a different column within each row.
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1	21. The switch matrix of claim 19 wherein an analog to digital converter senses a
-2 	switch status.
	22. The switch matrix of claim 19 further comprising a diode and resistor circuit for
	each scan line.
	23. A circuit for more efficient switch selection sensing, the circuit comprising:
2	a switch matrix including
3	a plurality of switches organized as a plurality of rows and columns; and
4	a plurality of resistors, each of the resistors electrically coupled in series with an
5	associated one of the plurality of switches;
6	a voltage threshold sensing circuit coupled to the switch matrix by a plurality of scan
7	lines; and
8	a processor coupled to the voltage threshold sensing circuit by a signal bus, wherein
9	selection of a row by a scan line returns column voltage levels from the switch matrix to



26. The circuit of claim 24 wherein the voltage threshold sensing circuit includes a voltage level converter including a transistor.